

Date: Tue, 31 May 94 04:30:27 PDT
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: Bulk
Subject: Ham-Homebrew Digest V94 #146
To: Ham-Homebrew

Ham-Homebrew Digest Tue, 31 May 94 Volume 94 : Issue 146

Today's Topics:

 Cheap 6M FM?
 Drake MN2000 to 160 meters-- Anyone done it?
 need homebrew "recipes"
 Techno Whizzy DDS
 Update on Hi-Pwr Solid-State Linear (2 msgs)
 Wanted : quartz oscillators source
 WANTED:reflector

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Mon, 30 May 1994 18:02:55 GMT
From: ihnp4.ucsd.edu!swrinde!cs.utexas.edu!howland.reston.ans.net!
newsserver.jvnc.net!yale.edu!noc.near.net!das-news.harvard.edu!
cantaloupe.srv.cs.cmu.edu!tew@network.ucsd.edu
Subject: Cheap 6M FM?
To: ham-homebrew@ucsd.edu

Radio Shack sells OEM'ed Maxon 49MHz FM 5 channel (15 kHz spacing)
walkie-talkies for around \$50. Has anyone successfully retuned one
of these to work 6 meter duplex (either 500KHz or 1MHz split)?

-Tom, KA8HML
tew+@cs.cmu.edu

Date: Tue, 31 May 94 05:56:09 -0500
From: news.delphi.com!usenet@uunet.uu.net
Subject: Drake MN2000 to 160 meters-- Anyone done it?
To: ham-homebrew@ucsd.edu

Alan, I think you're right. Always interesting to see though if anyone has ever done this... already working on external box! Tnx 73 Al W1EOX

Date: Mon, 30 May 1994 08:27:30 GMT
From: ihnp4.ucsd.edu!agate!iat.holonet.net!tcfarm!john.jewkes@network.ucsd.edu
Subject: need homebrew "recipes"
To: ham-homebrew@ucsd.edu

howdy from out in Oregon!!

I need to find some easy-building 2m, 6m, 70cm, 10m, etc. projects! I don't have the funds necessary to spend big for fancy new equipment, and recently, I had my one nice mobile radio stolen!! please, help if you can by sending info on where / how to find schematics/ circuit designs on how to build this equip.

73 DE KB7WTD, John in Gresham, Oregon
(listed in the call book!!!

Date: 30 May 1994 13:20:07 -0400
From: newstf01.cr1.aol.com!search01.news.aol.com!not-for-mail@uunet.uu.net
Subject: Techno Whizzy DDS
To: ham-homebrew@ucsd.edu

Is anybody expirimenting with the techno whizzy dds or any other DDS. Has any body read the two tech articles in QST by Rohde on receivers ?

73's de Mike K6ZSR

Date: 30 May 94 18:24:27 GMT
From: ihnp4.ucsd.edu!usc!howland.reston.ans.net!vixen.cso.uiuc.edu!uicsl.csl.uiuc.edu!eagle.csl.uiuc.edu!gene@network.ucsd.edu
Subject: Update on Hi-Pwr Solid-State Linear
To: ham-homebrew@ucsd.edu

[MosFet-Linear1

About a month ago, I posted my experience building a high-power solid-state

linear using eight \$1.50 MosFets, and very simple circuitry. I'm happy to report that it is working fine and exceeds my expectations, especially on 160 meters, where I can measure 600v P-P across the 50-ohm antenna output connector. This is 900 watts PEP....with the power supply delivering about 5 amps @ 160v. The actual peak currents would be 1.41 x greater for peak amperes of 7amps, for peak dc input of 1120 watts, for an instantaneous efficiency of 80% at the peak.

However, as usual there are always things to be changed or added: I added a more-or-less conventional SWR bridge detector just prior to the 50-ohm antenna coaxial output connector....i.e. passed the ungrounded side of the output link which was passed through the hollow 1/4" copper tubing used as the resonant output coil. When the SWR reaches 2 or 3, the bridge-circuit generates currents exceeding 1 ma which is then passed thru the base-emitter junction of an NPN transistor, which conducts and shorts out the forward-bias line (common to all eight MosFets)...reducing RF output to a safe level. A 0-1ma meter in this SWR bridge output provides the usual viewing of SWR. I did not bother to include the Forward power option, altho that would be easy enough if desired.

Also, I was not too happy with the previous method of limiting In-Rush currents to the 10,000 uf filters, during power-up. As I mentioned, I like to turn my linear off-and-on frequently. As a matter-of-fact, my relay (which had been made more sensitive to facilitate time-delay) proved to be marginal.. and the contacts would stick closed occasionally...and if not noticed, gives big trouble because of MASSIVE in-rush current....i.e. the zero-charge 10,000 uf capacitors look like a dead-short at the first instant! As a minimum, this will ruin a conventional heavy-duty toggle switch..usually welding the contacts closed, which becomes a safety problem, because you may assume you have switched it off, when in fact it remains ON! And although silicon rectifiers are amazingly tough, it will eventually get one of them. So.....

I have now changed the power-up circuit to a SOFT-power-up that I like very much. It may sound a little complicated to describe, but in reality is very simple to install: At a recent Hamfest I got a few used IRF-150 power MosFets (100v, 40A, 0.055ohm) for almost nothing...although Newark sells them for about \$3.50. To describe the circuit:

1. Begin with two 10w 50ohm resistors in series to limit the In-rush to the 10,000uf.
2. Allow 4 or 5 seconds to let this (100ohms) precharge the filters up to perhaps 80 to 100 volts.
3. Connect a MosFet across each of the individual 50-ohm resistors...Drain most positive-end, Source the other end....but leave both MosFets non-conducting for the first 4 or 5 seconds.
4. After about 4 seconds, one of the Mosfets will begin to conduct, and and soon become a 0.055 ohm short.
5. After about 6 seconds, the second MosFet begins to conduct and soon becomes a 0.055 ohm short, thus shorting out the second 10-ohm resistor. So power-supply has come from 0 to full voltage in about 7 seconds, and has enjoyed a VERY SOFT turn-on. The main power DPST toggle switch only switches less than 2 amps max....i.e 1.41x120/100 into an instantaneous

dead short.

6. To get the MosFets to do these nice things, we need two floating 9 or 10 volt supplies, and to make it idiot-proof you should also use a DPDT relay. I could have used two junk-box miniature 12.6 ct transformers to create these two floating supplies, but I chose to use two DuraCell 9v batteries which apparently have a shelf-life of 5 years (At least the package said, install before 1999). The Mosfets have no conduction at zero gate-source voltage, but become a 0.055 ohm short with 9 or 10 v positive on the gate. I put a 1K resistor at the gate, which then goes to the "common" of a SPDT contact-set; The NC contact goes to the source, which assures that the gate is discharged to zero. Also the NEG of the 9v battery connects to the Source. The POS of the battery goes through a 5 megohm resistor on this particular MosFet (it will be 10 megohm on the other), to the NO contact of the SPDT contact-set. My relay is a 120v AC which gets energized immediately at power-up.

The second MosFet is wired the same, except that its Time-Constant is twice as long, before it charges up to 9v and turns on the MosFet. Notice that the battery has no load current except a few microamps for a few seconds during power up. THE REASON that it is important to use a relay, is to insure that the 9v charge on the MosFet gates gets discharged immediately...otherwise it holds some charge for quite a long time (as I found out the hard way), so that if you power back up shortly after turn-off, they may still be in a highly conductive state, and additionally, one must assure that the 100v rating is not even momentarily exceeded. Note that at turn-on, there is an instantaneous 170v (120×1.41) imposed across the two 50 ohm resistors.. i.e. into an initial dead-short. This would exceed the 100v rating, except that the two equal resistors ensures that this is shared equally at 85v each (this is why it is important that both MosFets be non-conducting at turn on and until the pre-charging has reached 70 or 80 volts so that the remaining voltage difference will not exceed 100v when either MosFet begins to conduct.

7. Note that the MosFets only dissipate a small amount of power for a short period before they "short themselves out"....so no heat-sinks are required. As a matter of fact, I mounted them by literally soldering the Source-pin directly on the NC contact terminal on the relay which is quite sturdy. (I do a lot of "air-wiring" on my experiments). Also, the 9v DuraCell terminals take solder nicely, so no need for special connectors. Remember however, that the batteries are floating at the 170v level, so the cases should have adequate insulation, and also should not touch each other.

The Ham Radio hobby, for me, is more experimenting than it is operating, and consequently I have already purchased sixteen IRF-710 MosFets @ \$1.49 (IR)..from Newark (Mot are \$1.12)...these should be a little faster and may work better on 80 meters, and possibly 40 meters with minimal complication. One Data manual suggests that the most important rule-of-thumb for faster switching, is the $G_m/Rev-Cap$ (G_{fs}/C_{rss}) ratio. The IRF-710 is considerably

better than the IRF-722's that I am using now. I plan to use eight in parallel for each half of the push-pull...total of 16. I will increase the source resistor from 2-ohm, to 3.3-ohm.

Note that the present design (at least on 160 meters) is approaching the ideal limit for the simple 1:1 resonant tank-circuit in the output, i.e. each drain is quiescently at 160 volts, and can only swing between 320 and zero (more practically, 310 and 10 for a p-p value of 300v. Because of the push-pull resonant tank-coil, and the auto-transformer effect, this results in 600v p-p across the total coil and thus across the 50-ohm output link to the antenna and this is what I measure with an oscilloscope...i.e 900w.

Thus, getting higher voltage across the coil, will require the drains being tapped down a little from the coil-ends..perhaps 10 or 20% from each end...representing perhaps a drain-to drain impedance of 30 to 40 ohms, and so paralleling more MosFets will meet this requirement.

Practically speaking however, note that the present 900w available is only down about 2.8 db from the legal maximum of 1500w, so it would hardly be worthwhile...except that 16 MosFets would be virtually loafing. A bigger advantage would be realized on 80 meters, and probably 40 meters.

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Internet, BITNET: gene@csl.uiuc.edu

Date: 30 May 1994 23:00:57 -0500
From: ihnp4.ucsd.edu!usc!howland.reston.ans.net!vixen.cso.uiuc.edu!uwm.edu!
omnifest.uwm.edu!omnifest.uwm.edu!not-for-mail@network.ucsd.edu
Subject: Update on Hi-Pwr Solid-State Linear
To: ham-homebrew@ucsd.edu

Read your interesting update and you have piqued my interest. Have been building tube linears for many years, 811A,813,572B,4-400A,etc. I have been following the development of the solid state linear but have not seen anything in the realm as inexpensive as your design. I would be interested in finding out more.(I just got on internet and missed your original posting) Any information would be greatly appreciated.

Ray WB9ZIQ

Reply: raym@omnifest.uwm.edu

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Date: 31 May 1994 05:30:24 GMT
From: ankh.iaa.org!goldberp@uunet.uu.net
Subject: Wanted : quartz oscillators source

To: ham-homebrew@ucsd.edu

I'd like to order quartz oscillator of given freq.
PLEASE anyone who knows phone or mail order on radio components or other
source, let me know by mail (goldberp@iia.org)! Thankful in advance.
Peter

Date: Mon, 30 May 94 20:23:25 -0500
From: news.delphi.com!usenet@uunet.uu.net
Subject: WANTED:reflector
To: ham-homebrew@ucsd.edu

I'm looking for a 3 foot dish, only the dish without a mount and tripod. It
has to have good shape because it's for Ku band. And I'm looking at spending
no more than \$50 for the reflector. Please let me know of a supplier or if
someone has a reflector for sale.

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End of Ham-Homebrew Digest V94 #146
